

What is claimed is:

1. A method of simulating on a computer an actual track route, the method comprised of the steps of:

specifying to the computer, a track event along an actual track route;  
5 reading a track event database by the computer to obtain a software model of the track event by which the track event can be simulated on the computer; and the computer presenting a simulation of the track event on a display device using the software model of the track event.

10 2. The method of claim 1 wherein the step of specifying a track event along an actual train route includes the step of specifying the location of the track event.

3. The method of claim 2 further including the step of:  
specifying to the computer, a terrain database from which to read terrain  
15 information for the terrain proximate to the track event;  
reading terrain information for the track event from the terrain database;  
reading a terrain model database to obtain a software model of the terrain proximate to the track event by which the terrain can be simulated on the computer; and  
said computer presenting a simulation of the terrain proximate to the track event.

20 4. The method of claim 1 further including the step of: storing the software model of the track event in a simulation file.

5. The method of claim 1 further including the steps of:  
25 reading a surface coverage database from which to obtain information on the surface coverage of terrain surrounding the track event;  
reading a surface coverage simulation database to obtain a software model of the surface coverage surrounding the track event and by which the surface coverage surrounding the track event can be simulated on the computer; and  
30 the computer generating a simulation of the surface coverage surrounding the track event.

6. The method of claim 3 wherein the information input to said computer from the terrain database includes information from a U.S. Geological Survey database.

7. The method of claim 2 wherein said actual location includes the latitude and longitude coordinates of track events.

5 8. The method of claim 3 wherein the proximate terrain information includes the elevation of the location of the first track event.

9. The method of claim 3 wherein the proximate terrain information includes climatic information for the location of said first track event.

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10. The method of claim 1 wherein said first track event includes at least one of:

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- a section of straight track;
- a track switch;
- a train signal or sign;
- a track crossing;
- a track curve; a track grade;
- a bridge
- a platform
- a tunnel
- an over-head power transmission

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11. A method of simulating on a computer an actual track route, the method comprised of the steps of:

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- specifying a track event along an actual track route to the computer;
- specifying the actual location of the track event;
- reading a track event model database by the computer to obtain there from, a software model of the track event by which the track event can be simulated on the computer; and

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- the computer generating a simulation of the track event on a display device, using the software model of the track event;
- the simulation of the track event including a simulation of the actual terrain proximate to the track event.

12. The method of claim 11 further including the step of: storing the software model of the track event in a simulation file.

5 13. The method of claim 11 further including the steps of:  
the computer obtaining surface coverage information for terrain proximate to the track event;  
the computer obtaining a software model for terrain proximate to the track event; and  
the computer generating a simulation of the surface coverage proximate to the track event.  
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14. The method of claim 11 wherein said actual location includes the latitude and longitude of the track event.

15 15. The method of claim 11 wherein the proximate terrain information includes the elevation of the location of the first track event.

16 16. The method of claim 11 wherein said proximate terrain information includes climatic information for the location of said first track event.  
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17. The method of claim 1 wherein the track event includes at least one of:  
a section of straight track;  
a track switch;  
a train signal;  
25 a track crossing;  
a track curve; a track grade  
a bridge  
a platform  
a tunnel  
30 an over-head power transmission

18. A method of simulating in a computer, the operation of a train along a track route comprised of the steps of:

identifying the starting and ending points of an actual track route to be simulated;

specifying to the computer, the location and the identity of a track event between the starting and ending points of the track route;

5           reading a track event database by the computer to obtain a software model of the track event by which the track event can be simulated on the computer;

          said computer obtaining from a terrain database, information about the terrain surrounding the track event; and

          said computer presenting on a display device that is coupled to said  
10       computer, a simulation of the track event, using the software model of the track event and the terrain information.

19.    The method of claim 18 further including the steps of:

          inputting to the computer, parameters of a train to traverse said track route;

15       and

          said computer presenting on a display device, a simulation of the train encountering the track event.

20.    The method of claim 18 further comprised of the step of:

20       simulating the train's response to the terrain surrounding said track event.

21.    The method of claim 19 further including the step of:

          the computer reading a simulation of the surface coverage of terrain proximate to the first track event.

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22.    The method of claim 18 wherein the information input to said computer from said first database includes information from a U.S. Geological Survey database.

23.    The method of claim 18 wherein said actual location includes the latitude

30       and longitude coordinates of track events.

24.    The method of claim 18 wherein said first track event includes at least one  
of:

          a section of straight track;

5                   a track switch;  
                  a train signal;  
                  a track curve; a track grade  
                  a bridge  
                  a platform  
                  a tunnel  
                  an over-head power transmission.

10       25.     A method of simulating on a computer, the operation of a train along an  
          actual track route comprised of the steps of:  
                  inputting to the computer, the latitude and longitude coordinates and the  
                  identity of a track event along the actual track route;  
                  said computer obtaining from a storage device a software model of the  
                  track event;  
15               storing the software model of the track event in a simulation file;  
                  said computer executing the software model of the track event from the  
                  simulation file; and  
                  the computer displaying a three-dimensional simulation of the track event  
                  on a display device.

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          26.     A method of simulating on a computer, the operation of a train along an  
          actual track route comprised of the steps of:  
                  inputting to said computer, the location and identity of a track event along  
25               said track route;  
                  obtaining a software simulation of the track event from a track event  
                  simulation database;  
                  obtaining terrain information for the location of the track event from a  
                  terrain database;  
30               obtaining local land coverage information for the location of the track  
                  event from surface coverage database;  
                  obtaining a software simulation of the surface coverage surrounding the  
                  track event;  
                  storing the software simulation of the track event in a simulation file;

storing the software simulation of the surface coverage in the simulation file;

displaying on a display device, a simulation of the track event using the software simulation of the track event stored in the simulation file;

5 displaying on a display device, a simulation of the terrain around the track event using the software simulation of the surface coverage in the simulation file.

27. A method of simulating on a computer, the operation of a train along an actual track route comprised of the steps of:

10 inputting to said computer, the location and description of a plurality of track events along said track route;

obtaining from a track event model database, a software model for each track event;

15 storing a software model for each track event along the track route in a simulation file;

displaying on a display device, the simulations of the track events along the track route using the software models of track events stored in the simulation file.

20 28. A method of simulating on a computer, the operation of a train along an actual track route comprised of the steps of:

inputting to said computer, the location and description of a plurality of track events along said track route;

25 obtaining from a track event model database, a software model for each track event;

obtaining from a terrain database, terrain information for each track event along the track route;

storing a software model for each track event along the track route in a simulation file;

30 storing the terrain information for each track event in the simulation file;

displaying on a display device, the simulations of the track events along the track route using the software models of track events stored in the simulation file and using the terrain information stored in the simulation file.

29. A system for displaying the operation of a train along an actual track route comprised of:

a processor;

a display device operatively coupled to the processor;

5 an input/output device operatively coupled to the processor, through which at least track events along an actual train track can be specified to the processor;

a storage device, operatively coupled to said processor, said storage device storing computer program instructions and data, which when executed, cause the processor to present on the display device, a simulation of the track event along an  
10 actual train route using a software model of the track event that is stored in a memory device that is operatively coupled to the processor.

30. The system of claim 30 wherein the storage device stores instructions which when executed cause the processor to present on the display device, a simulation of  
15 track events using terrain data for terrain that is proximate to the track event.

31. A system for displaying the operation of a train along an actual track route comprised of:

a processor;

20 a display device operatively coupled to the processor;

an input/output device operatively coupled to the processor, through which track events along an actual train track can be specified to the processor by their type and actual location;

a storage device, operatively coupled to said processor, said storage device storing computer program instructions and data, which when executed, cause the  
25 processor to:

store software simulations of track events in a simulation file;

read software simulations stored in the simulation file and sequentially present on the display device, a simulation of a track event along an actual train route using a  
30 software model of the track event that is stored in the simulation file.